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EXAMINATION OF THE CHEST:
ADVANTAGES OF CONDUCTING
AND REPORTING IT IN ENGLISH

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THE Austrians and the French were pioneers in physical examination of the chest. Their English-speaking pupils brought back some queer linguistic baggage which, after 150 years, still mars our reports. The French word *bruit* means noise and is used in France for the sounds we call the first, second, third, and fourth sounds, but never for murmurs. *Son*, used by the French for more musical sounds, is never used in description of heart sounds. We have *bruit* in English, pronounced broot according to our dictionaries, used as a noun (for rumor) or verb: "It is bruited about." The French plural is pronounced brrew-ee, with the *s* silent, but American doctors talk of brewies over stenosing arteries, or even for cardiac murmurs. The French for these sounds is *souffles*, translated puffs. They use *claquements* for sounds more brief than the second sound. Our equivalent is snap for the mitral valve which cannot open, and click for such high-pitched, brief sounds when they occur during systole. We should drop brewies, since we cannot pronounce it properly or apply it correctly, and use murmurs for prolonged noises heard over the precordium or arteries.

Intensity of murmurs is reported in Grades 1 to 6, but it is better to report sounds or murmurs as loudest at such and such a point and to qualify them as faint or loud if that is worth noting. If very loud, the

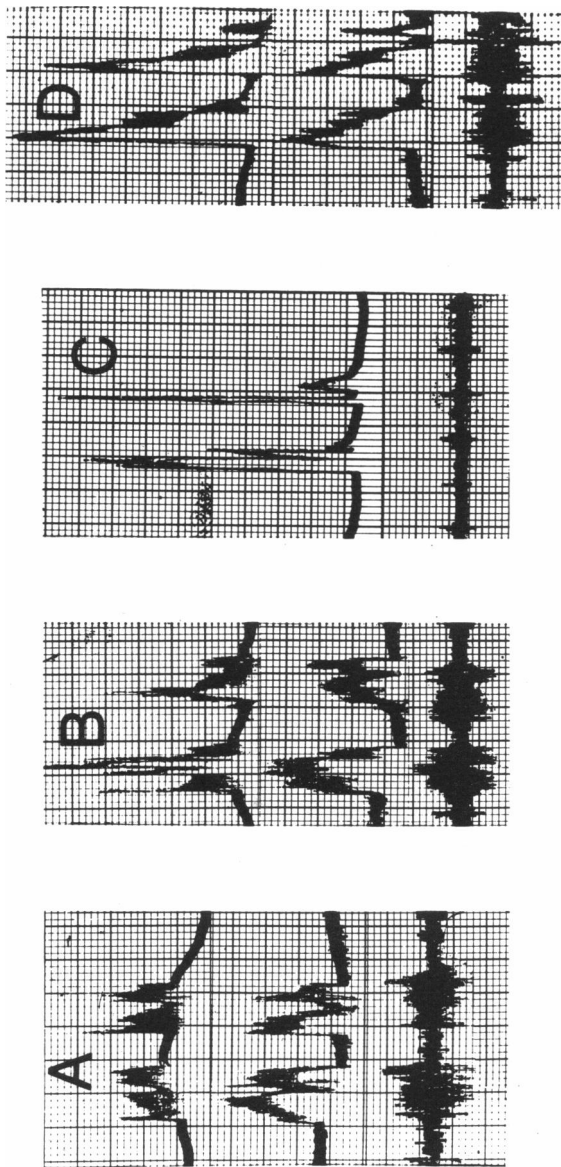


Fig. 1. In this and subsequent traces, the upper band is derived from sounds of frequency above 240 cycles per second; the middle band from sounds 80 to 240 cycles and the lower band from sounds 20 to 80 cps. At each frequency amplification is constant in all traces, Figures 1 to 8. Here the microphone was strapped to the chest at the sixth interspace in the midaxillary line. *A*, as subject, says "boogy woogy";

B, "boy boy"; *C*, "ninety nine"; *D*, "*neun und neunzig*" (noyn unt noynzig). In *C*, only the top and bottom bands are shown, since ninety-nine produces much energy above 240 cps. and, below 80 cps., only the distant heart sounds come through. Only the low-pitched vibrations, as in *A*, *B*, and *D*, are palpable when the subject talks quietly.

sound should be described as "with a thrill," for that is what Grade 6 means. It is not necessary to add "palpable," since palpable is what all thrills are. Use of crescendo and decrescendo is proper on a musical score, but for murmurs the appropriate terms are brief, prolonged, rising, falling—or merely mid-systolic or mid-diastolic—for murmurs which rise and fall and are often called diamond-shaped, that is, like the marker on one suit of cards. When no phonocardiogram has been recorded, use of this term is misleading, since diamonds may be round, square-cut, or pear-shaped. Phonocardiograms should be reported as showing murmurs which peak so many hundredths of a second after the Q wave or after the first or second sound, and last for a given length of time. Sounds or murmurs now reported as 1/6, or I/VI, are faint; those reported as 5/6 or 6/6 are loud, but they may vary greatly, between inspiration and expiration or at areas only a few centimeters apart. It is important to note where they are loudest; qualifying in gradations of 18% is of no value. The sounds at the apex often increase three- to five-fold between recumbency and 60° left lateral posture. As examples of useful, concise statements, we may say "the faint, falling murmur after a normal first sound is loudest medial to the point of maximal impulse" or a "midsystolic murmur, very loud above the right clavicle but faint over the precordium, where it is best heard at apex and to left of lower sternum."

When Laennec made rounds and taught doctors who came from Spain, Sweden, Holland, and even Pennsylvania, he taught in Latin, which they and he had learned before they began the study of medicine (in Laennec's case this was before he was 16). When he heard abnormal breath sounds he reported *rastulae*—*râles* in French, rattles in English. He often qualified this by such terms as *crepitantes*, crackling, or *bullantes*, bubbling. We translated the bubbling, left *crepitant* and *subcrepitant* for crackling. We still use *râles*, mispronounced rals, or even rails, although as in *bruits*, the *s* should be silent. Probably the best translation of *crepitant râles* would have been rustles. As things now stand, *râles* should be Anglicized as rals, a word which has no singular form. The evolution from *rastulae* to *râles* to rals would thus parallel that from presbyter to *prebstre* to *prêtre* to priest. The adjectives now used with *râles* should be reduced from the dozens in our medical dictionaries to fine (or faint), coarse (or loud). We should indicate the area where *râles* are noted and where they are loudest. Wheezes and

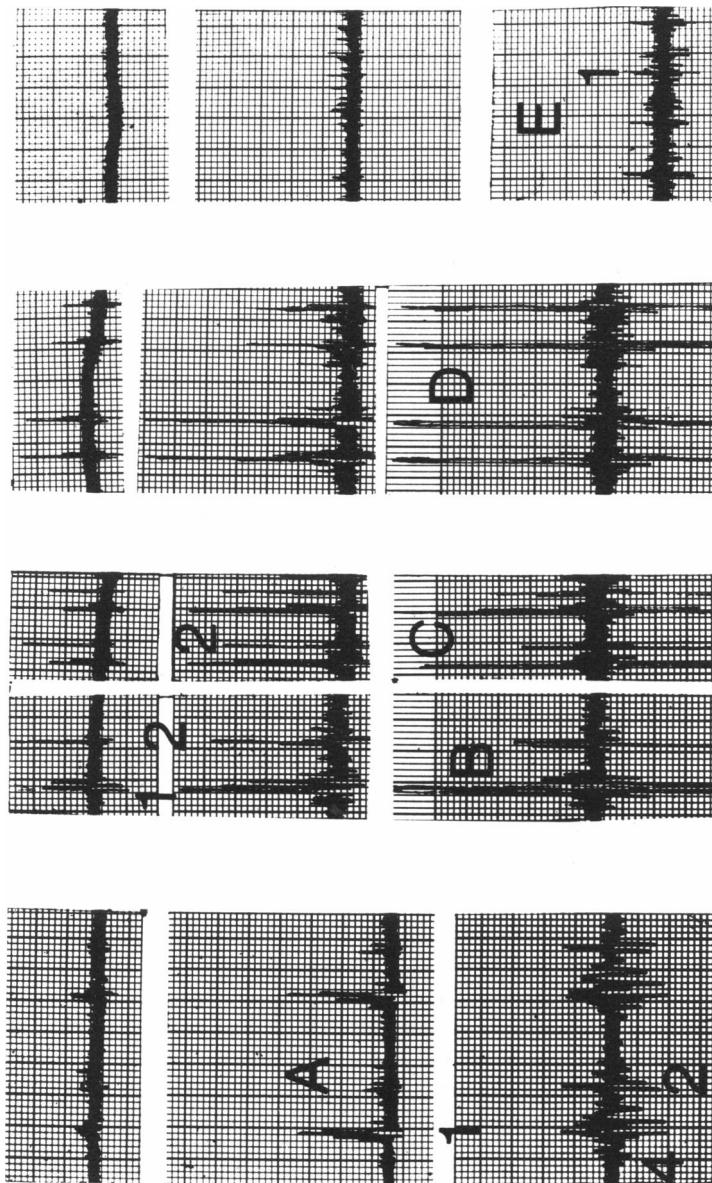


Fig. 2. The heart sounds of a normal subject recorded at a paper speed of 25. mm. per second in *A* and *B*; in *C*, *D*, and *E* they are recorded at 10 mm./sec., as in Figures 1, 3, and 4. *A*, heart sounds recorded from the apical area; *B* and *C* from the plumbic area; *E*, from the right chest wall, as in Figure 1.

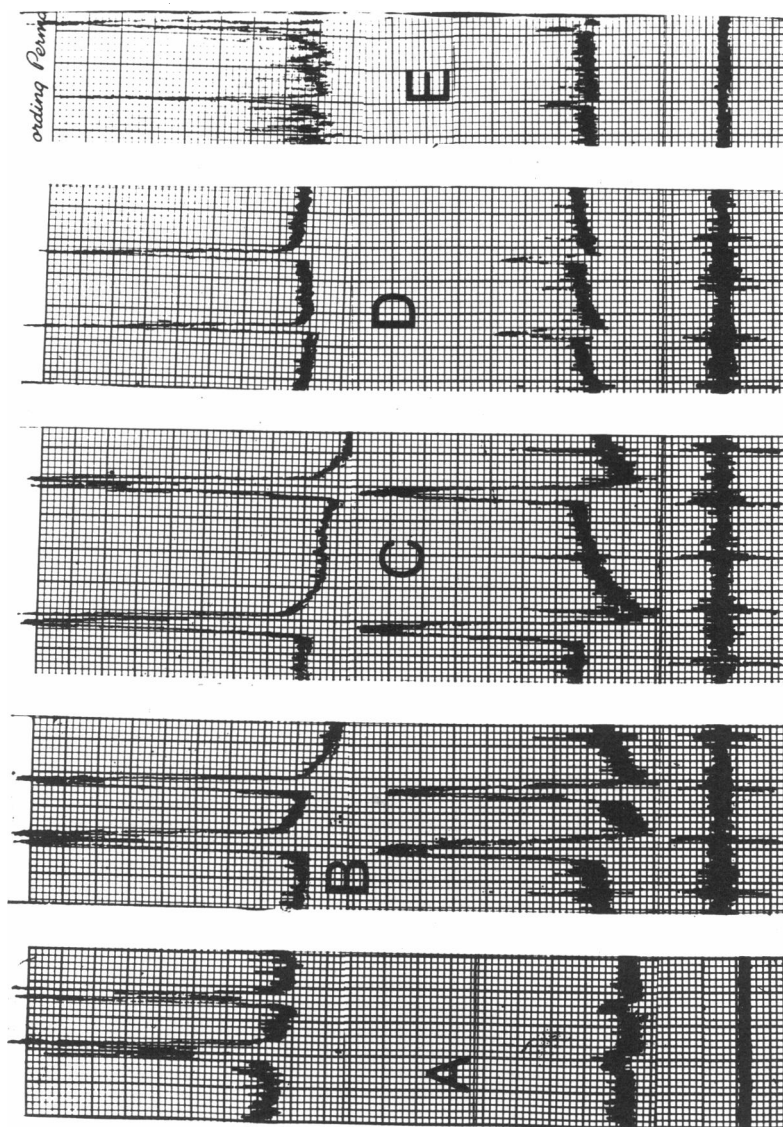
D, with microphone as in *E*, shows sounds evoked by suddenly tensing a handkerchief with one edge held on the sternum. The numbers show the positions of the first (1), second (2), and fourth (4) sounds. Tensing the handkerchief produced a sound similar to the first heart sound in pitch and duration.

rattles should be used for breathing that is audible close to the patient. To-and-fro is used for sounds audible on expiration. This is contrasted with the usual rales heard only on inspiration.

When our medical ancestors studied in Austria or Germany, they observed that physicians asked patients to say *neun und neunzig* to evoke fremitus over the thorax. When they came home they taught their patients to say ninety-nine, thus translating literally, but not phonetically, what they had heard. This was a serious error, since their teachers would have asked patients to say: *nein, nein*, if that was the sound they had wanted. *Nein, nein* was what every girl had been taught to say to overeager swains, and men said it to friends who wanted a loan. *Neun und neunzig* is pronounced noyn unt noynzig and the oy is what it takes to evoke palpable, low-pitched vibrations, most effectively transmitted from the larynx to the rib-cage. "*Nein, nein*" and ninety-nine are high-pitched sounds, useless for evoking fremitus. We continue to translate the one phrase we should have left in German, while leaving untranslated, or mistranslated and mispronounced, bruits and râles. We should use boy, boy, or boogy, woogy, as equivalents of *neun und neunzig*, as shown in Figure 1.

In addition to our linguistic errors, we continue to use, in urban 1970, the phrases which were so meaningful to men such as Laennec and James B. Herrick, who came from the country to study medicine in earlier decades or centuries. Sounds of sea gulls crying, cranes whooping, geese honking, and horses clattering down dirt roads were once fine analogues for certain cardiac murmurs or sonic rhythms. The sea gull's cry is loud and high-pitched, the crane's whoop is low-pitched. Our records will be more intelligible, now and after the last crane, gull, and horse have vanished, if we use loud, loud and shrill, loud and deep, and use triple rhythm rather than gallop rhythm. Actually the triple rhythm sounds like a horse cantering. Galloping sounds more like tachycardia with a split-second sound. When recorded along with the electrocardiogram, some split first sounds at the apex turn out to be due to late fourth heart sounds, others to a loud sound from the pulmonic artery or aorta as pressure rises swiftly at the onset of systolic ejection and, at fast rates, this sounds like a galloping horse on a dirt road. Triple rhythm means we think we hear, or proper records prove, that there is a sound in diastole like those in systole.

Our efforts to mimic heart sounds by means of the voice are as weird



to the chest, to the right of the sternum. *A* and *B*, "lub dut"; *C*, "snap snap"; *D* and *E*, "click click." The latter, although much weaker in low-pitched vibrations, most closely resembles the heart sounds.

Fig. 3. Sounds produced by the voice. In *A* and *E* the microphone was held five feet from the mouth, and shows high-pitched ambient noise in addition to voice sounds. In *B*, *C*, and *D*, the microphone was strapped

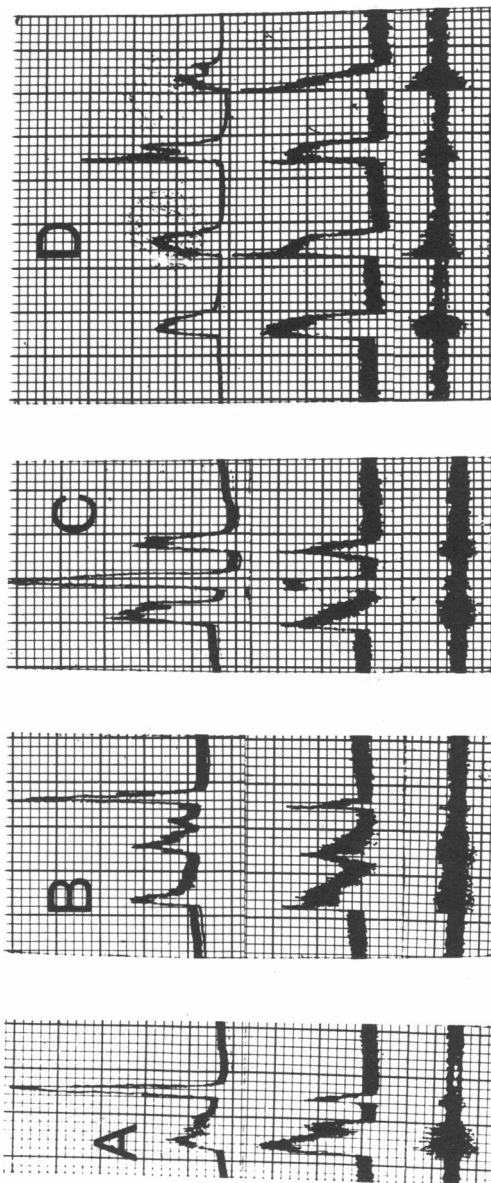


Fig. 4. Voice sounds recorded as in *A* and *E* of Figure 3 but with much less amplification of sounds above 80 cps. "Oh" and "No" represent first, third, or fourth sounds, "dear" the second sound. A comma represents normal systolic silence. *A*, normal sounds—"oh, dear"; *B*, simulating triple rhythm due to a fourth sound—"no no, dear"; *C*, triple rhythm due to a third sound—"no, dear no"; *D*, quadruple rhythm,

as heard over an aneurysm at the apical area—"oh no!, dear no." Note that the sound in "no" rises to peak faster than in "oh," that "dear" is much richer in high-pitched sound than "oh," and that "oh" is more prolonged and equal to the duration of a normal first sound followed by an early, falling (decrescendo) murmur.

as our translations and failures to translate the words of the pioneers. As Dr. F. W. Palfrey demonstrated to students in Boston, heart sounds can be simulated best by tensing a handkerchief, as seen in Figures 2 and 3, where this sound can be compared with the usual "lub dut," "snap," and "click." Records of spoken cry, honk, and whoop provide amusing contrasts to records of aortic and mitral murmurs to which these words have been applied by cardiologists. On the ward one can simulate some sounds by using the hem of a white coat. The hands grasping it should be 10 to 12 inches apart for the first sound, six to eight inches for the second sound, and two to three inches for snaps and clicks. Pitch falls and duration of sound increases with longer strands or strings. Second sounds, the femoral pistol-shot sound of aortic insufficiency, and the sounds heard below a pressure cuff on the arm in estimating blood pressure all come from the short strands forming semilunar cusps and arterial walls. Longer and lower-pitched sounds are produced when longer chordae tendineae are drawn taut by closure of the atrioventricular valves. Snaps and clicks coming from the anterior mitral leaflet are even briefer and are higher in pitch.^{1, 2}

As for simulating triple or quadruple rhythms (gallop sounds), something can be done with the phrases "no, dear" for normal first and second sounds; "no no, dear" for fourth sounds; "no, dear no" for third sounds; and "no no! dear no" for the quadruple rhythm and loud first sound heard and recorded over apical aneurysms due to healed infarcts.³ For the ultimate, when the patient with an apical aneurism also has a click and systolic murmur from papillary muscle damage,⁴ we can make a try with "no No! clickum dear no."

We believe physical findings in the chest can best be taught and recorded in English, and can summarize:

Lub dut does not the heart sounds fake
Nor ninety-nine the thorax shake.

REFERENCES

1. Dock, W.: The genesis of diastolic heart sounds: The sonic potential of cardiac tissues and the diastolic sounds from mitral prostheses. *Amer. J. Med.* 50:178-84, 1971.
2. Dock, W.: The mode of production of systolic clicks due to prolapse of a mitral cusp. *Arch. Int. Med.* In press.
3. Dock, W.: Signos físicos de las aneurismas ventriculares con insuficiencias cardiacas debidos a la obstruccion de arterias coronarias. *Pren. Med. Argentin.* 53:341-44, 1966.
4. Steelman, R. B., White, R. S.; Hill, J. C., Nagle, J. P., and Choitlin, M. D.: Midsystolic clicks in arteriosclerotic heart disease: A new facet in the clinical syndrome of papillary muscle dysfunction. *Circulation* 44:503-13, 1971.